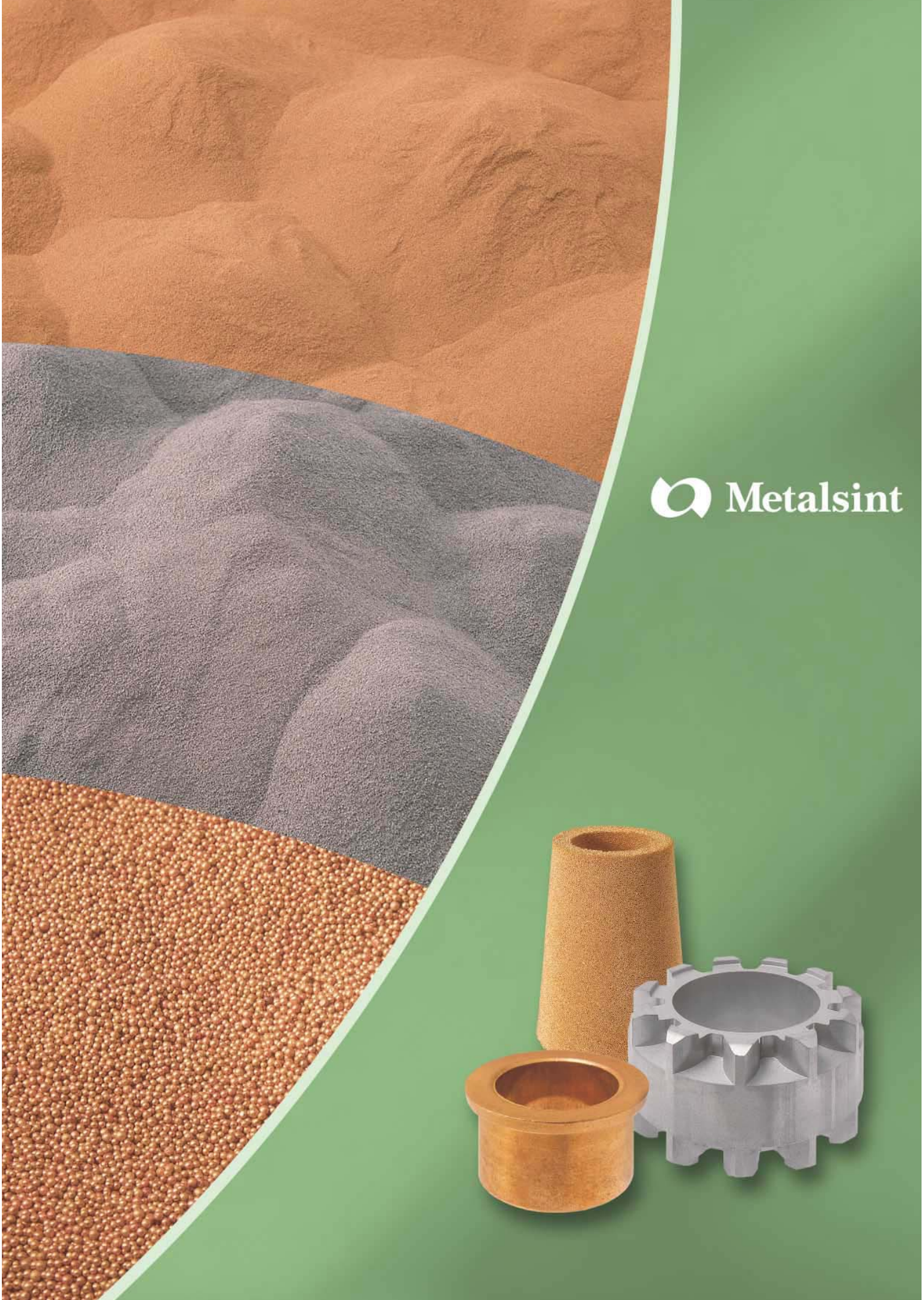


Metalsint

Spekané kovové filtre
Gesinterte Metallfilter
Sintered Metal Filters

Tvarové výlisky
Formpressteile
Structural Components

Samomazné pórovité ložiská
Selbstschmierende poröse Lager
Selflubricating Bearings

Metalsint

Company profile

Metalsint, joint stock company is a manufacturer of Powder Metallurgy components. It was established as an independent company in 1994 when the former state firm originally called ZVL Dolny Kubin was divided into some companies and an industrial area was built up where several home and foreign companies have their headquarters. Metalsint followed on 50-years experience in the field of powder metallurgy technology.

Production activities include following ranges:

- production of self-lubricating bearings
- production of structural components made from metal powders
- production of sintered metal filters

Metalsint exports about 80 – 85 %, automotive applications account for 30 % of the output. Production is currently at the rate of 500 tonnes per annum and is materialized on production space of 4 500 m^2.
About 80 % of the press tools are made in-house, the rest is bought from home and foreign leasing manufacturers of precision tools.
The company meets the International Quality Assurance Standards of ISO 9001 and VDA 6.1 and puts great emphasis on consulting activity in the product development stage and on performing inspection on both in-process work and service activity in the stage of product usage. The organisational chart of Metalsint is made in accordance with the requirements of these Standards.
Our reference list shows Metalsint's success in delivering to many well-known customers. Considerable capital investment was made to improve both manufacturing and quality assurance process. Metalsint has started to deliver pre-assembling units packed according to the environmental policy to meet EU requirements.
Materials used for PM components production meet international standards ISO, DIN, MPIF and ANFOR. Metalsint offers except for stainless steels and forged materials all material variations based on the alloyed iron powders (C, Cu, Ni, Mo, P, Cr) from which are manufactured and delivered structural components designated for following applications:

• soft magnetic materials	• elements of industrial gear-boxes
• elements of transporters	• pawls
• elements of locking mechanisms	• ratchet wheels
• elements of gear boxes	• elements of bicycles
• elements of engines	• hobby tools elements
• elements of axles	• elements of sewing machines
• elements of exhaust systems	• silencers
• elements of steering systems	• sound dampers
• elements of brake systems	• elements of office machines
• elements of electric appliances	• elements of textile machines

Metalsint, a. s.
Nábrežie Oravy 625/12
026 17 Dolný Kubín
SLOVAKIA

Metalsint

Reference list

Referenzliste

Referenčný list

Customer *Kunde* *Zákazník*	*Seat* *Ort* *Sídlo*	*Country* *Land* *Krajina*
ŠKODA AUTO, a. s.	Mladá Boleslav	CZ
ČZ STRAKONICE AUTO, a. s.	Strakonice	CZ
ETA HLINSKO, a. s.	Hlinsko	CZ
MOTOCO, a. s.	České Budějovice	CZ
FAB RYCHNOV, a. s.	Rychnov nad Kněžnou	CZ
GARDENA, s. r. o.	Třinec	CZ
PRINS METALLURGISCHE PRODUCTEN BV	Amersfoort	NL
RIDDER AANDRIJFSYSTEM BV	Harderwijk	NL
INDUMES, BV	St. Michielsgestel	NL
FAIREY ARLON, BV	Arnheim	NL
BIOROCK INTERNATIONAL BV	Onnen	NL
VOLKSWAGEN AG	Chemnitz	D
DÜRKOPP ADLER AG	Bielefeld	D
BENTELER, AG	Warburg	D
SUSPA HOLDING	Sulzbach-Rosenberg	D
IPM, GMBH	Bornheim	D
BPW GMBH & CO.KG	Paderborn	D
TRW FAHRWERKSYSTEME, GMBH	Düsseldorf	D
TENNECO WALKER	Birmingham	GB
AGROCOOP FRANCE	Paris	F
CDT SRL	Imola	I
GEORG FISCHER DISA, AG	Schaffhausen	CH
SABEX	Durban	JAR
RIDGE TOOL COMPANY	Cork	IRL
WHIRLPOOL SLOVAKIA a. s.	Poprad	SK
METALTRADE s. r. o.	Bratislava	SK
KINEX, a. s.	Bytča	SK

Metalsint, a. s.
Nábrežie Oravy 625/12
026 17 Dolný Kubín
SLOVAKIA

Metalsint

CERTIFICATE

The TÜV CERT Certification Body of RWTÜV Anlagentechnik GmbH

hereby certifies in accordance with TÜV CERT procedure that

METALSINT, a. s.
Nábrežie Oravy 625/12
026 17 Dolný Kubín
Slovak Republic

has established and applies a quality system for

Development, production and sales of powder metallurgy products

An audit was performed, Report No. **2.5-0015/1998**
Proof has been furnished that the requirements according to
ISO 9001 : 1994 / EN ISO 9001 : 1994
are fulfilled. The certificate is valid until **14.12.2003**
Certificate Registration No. **041008582**
The company has been certified since **1998**

Essen 24.08.2001

RWTÜV

SUPPLEMENTARY CERTIFICATE

The TÜV CERT Certification Body
of RWTÜV Anlagentechnik GmbH

VERBAND DER AUTOMOBILINDUSTRIE e.V. (VDA) / Cert. N° 07/97

certifies in accordance with
TÜV CERT procedures that

METALSINT, a. s.
Nábrežie Oravy 625/17
026 17 Dolný Kubín
Slovak Republic

Producer of powder metallurgy products
for the Automotive Industry
applies a

quality system in accordance with VDA 6, Part 1
- material products -

without product development

This supplementary certificate is only valid in conjunction with TÜV CERT Certificate
Registration No. 041008582
It certifies that the QM System is additionally qualified on the basis of the fulfilment of the requirements of
VDA 6, Part 1 extending the requirements of EN ISO 9001:1994
Proof has been furnished within the framework of the certification audit, Report No. 2.5-0015/1998

This certificate is valid until 14.12.2003
Date of issue 24.10.2001

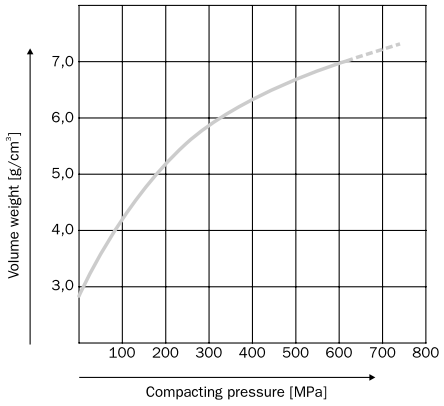
Structural PM components made from sintered metals

Powder Metallurgy offers the most effective route for producing structural components in a cost effective manner which would not be possible by conventional metallurgy. Sintered metals are each time more available for the use of the design engineers.

Manufacturing process:

The powder metal is placed in a high precision mould then compression moulded at room temperature in an automatic compacting machine. The compacted workpiece is placed in a sintering furnace where it is heated in a protection atmosphere at temperature below the melting point of the metals (80-90 per cent of melting point).

In order to increase the dimensional precision components go through post processes such as sizing, machining, heat treatment before completing the manufacturing process. The parts are finally oil impregnated for lubrication.



Reached density in dependence on compacting pressure.

Precision of components

	dimensions	
	radial	**axial**
sized IT 7		up to 20 mm ± 0,10 over 20 mm ± 0,15
un-sized IT 8 – 10		up to 20 mm ± 0,10 over 20 mm ± 0,15

Post processes:

1. Machining

All kinds of machining are possible to use for sintered metal parts. When machining higher cutting speeds and light feed are generally recommended to use. Using hard metal tooling is of great advantage.

Cooling liquids are not recommended to use in spite of the fact that liquid residues remaining in pores could cause the corrosion.

Machined PM parts are recommended to be oil impregnated as soon as possible.

2. Heat treatment

The sintered metals are processed similar to the homogenous materials. Due to the porous character the sintered metal is of relatively low thermal conductivity what leeds to the worse hardenability and low strength.

Therefore sintered metal parts are heat treated using the carbo-nitriding process in gas under the protective atmosphere. This hardening process enables to reach the surface strength of 30-50 HRc in dependence on the density.

3. Surface finishing

To give the sintered parts a good surface finish the parts are steam treated with following oil impreganation process. Common anti-corrosion treatments are possible but soaking with resin or copper infiltration is needed prior to coating. Electro - plating is found to be suitable for machined surface only.

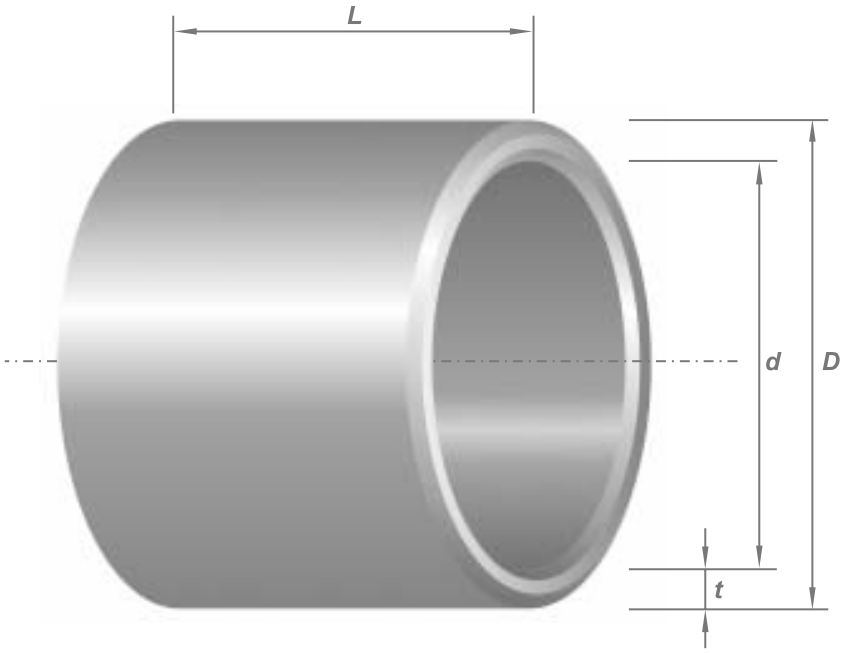
Table of sintered materials for compacting according to the DIN Standard 30 910:

Material		symbol	Allowed range											Model examples												
			Density	Porosity	Chemical content								Hard-ness	density	Chemical content								Tensile strength	Tensile strength-limit	Elongation	hardness	E-modul
		Sint-	Q	$\frac{\Delta V}{V}$. 100	C	Cu	Ni	Mo	Sn	P	Fe	others	HB	Q	C	Cu	Ni	Mo	Sn	P	Fe	others	Rm	Rp 0,1	A	HB	E . 10^2
			g/cm³	%	%	%	%	%	%	%	%	%		g/cm³	%	%	%	%	%	%	%	%	N/mm²	N/mm²	%		N/mm²
Sintered iron		C 00 D 00 E 00	6,4 up to 6,8 6,8 up to 7,2 > 7,2	15 ± 2,5 10 ± 2,5 < 7,5	< 0,3	< 1	–	–	–	–	rest	< 2	> 35 > 45 > 60	6,6 6,9 7,3	–	–	–	–	–	–	rest	< 0,5	130 190 250	60 90 130	4 10 18	40 50 65	100 130 160
Sintered steel	contains C	C 01 D 01	6,4 up to 6,8 6,8 up to 7,2	15 ± 2,5 10 ± 2,5	0,3 up to 0,6	< 1	–	–	–	–	rest	< 2	> 70 > 90	6,6 6,9	0,5	–	–	–	–	–	rest	< 0,5	260 320	180 210	3 3	80 100	100 130
	contains Cu	C 10 D 10 E 10	6,4 up to 6,8 6,8 up to 7,2 > 7,2	15 ± 2,5 10 ± 2,5 < 7,5	< 0,3	1 up to 5	–	–	–	–	rest	< 2	> 40 > 50 > 80	6,6 6,9 7,3	–	1,5	–	–	–	–	rest	< 0,5	230 300 400	160 210 290	3 6 12	55 85 120	100 130 160
	contains Cu and C	C 11 D 11	6,4 up to 6,8 6,8 up to 7,2	15 ± 2,5 10 ± 2,5	0,4 up to 1,5	1 up to 5	–	–	–	–	rest	< 2	> 80 > 95	6,6 6,9	0,6	1,5	–	–	–	–	rest	< 0,5	460 570	320 400	2 2	125 150	100 130
		C 21	6,4 up to 6,8	15 ± 2,5		5 up to 10	–	–	–	–	rest	< 2	> 105	6,6	0,8	6,0	–	–	–	–	rest	< 0,5	530	440	< 1	150	100
	contains Cu, Ni, and Mo	C 30 D 30 E 30	6,4 up to 6,8 6,8 up to 7,2 > 7,2	15 ± 2,5 10 ± 2,5 < 7,5	< 0,3	1 up to 5	1 up to 5	< 0,8	–	–	rest	< 2	> 55 > 60 > 90	6,6 6,9 7,3	0,3	1,5	4,0	0,5	–	–	rest	< 0,5	390 510 680	310 370 440	2 3 5	105 130 170	100 130 160
	contains P	C 35 D 35	6,4 up to 6,8 6,8 up to 7,2	15 ± 2,5 10 ± 2,5	< 0,3	< 1	–	–	–	0,3 up to 0,6	rest	< 2	> 70 > 80	6,6 6,9	–	–	–	–	–	0,45	rest	< 0,5	310 330	200 230	11 12	85 90	100 130
	contains Cu and P	C 36 D 36	6,4 up to 6,8 6,8 up to 7,2	15 ± 2,5 10 ± 2,5	< 0,3	1 up to 5	–	–	–	0,3 up to 0,6	rest	< 2	> 80 > 90	6,6 6,9	–	2,0	–	–	–	0,45	rest	< 0,5	360 380	200 320	5 6	100 105	100 130
	contains Cu, Ni, Mo and C	C 39 D 39	6,4 up to 6,8 6,8 up to 7,2	15 ± 2,5 10 ± 2,5	0,3 up to 0,6	1 up to 3	1 up to 5	< 0,8	–	–	rest	< 2	> 90 > 120	6,6 6,9	0,5	1,5	4,0	0,5	–	–	rest	< 0,5	520 600	370 420	1 2	150 180	100 130
Stainless steel	AISI 316	C 40 D 40	6,4 up to 6,8 6,8 up to 7,2	15 ± 2,5 10 ± 2,5	< 0,08	–	10 up to 14	2 up to 4	–	Cr 16 up to 19	rest	< 2	> 95 > 125	6,6 6,9	0,06	–	13	2,5	–	Cr 18	rest	< 0,5	330 400	250 320	1 2	110 135	100 130
	AISI 430	C 42	6,4 up to 6,8	15 ± 2,5	< 0,08	–	–	–	–	Cr 16 up to 19	rest	< 2	> 140	6,6	0,06	–	–	–	–	Cr 18	rest	< 0,5	420	330	1	170	100
	AISI 410	C 43	6,4 up to 6,8	15 ± 2,5	0,1 up to 0,3	–	–	–	–	Cr 11 up to 13	rest	< 2	> 165	6,6	0,2	–	–	–	–	Cr 13	rest	< 0,5	510	370	1	180	100
Sintered bronze		C 50 D 50	7,2 up to 7,7 7,7 up to 8,1	15 ± 2,5 10 ± 2,5	–	rest	–	–	9 up to 11	–	–	< 2	> 35 > 45	7,4 7,9	–	rest	–	–	10	–	–	< 0,5	150 220	90 120	4 6	40 55	50 70

Metalsint

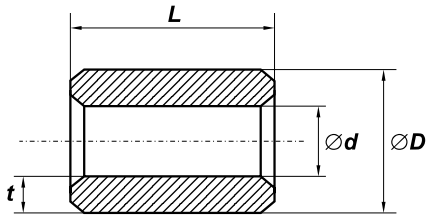
Bronze self-lubricated porous bearings

Basic sizes of plain bearings



Basic sizes

Dimensions



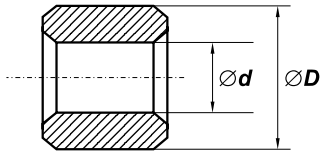
Tolerance field		
d	≤ 40	G7
	> 40	G8
D	≤ 50	s7
	> 50	s8
t	≤ D50	IT8
	> D50	IT9
L		jsl3

For fitted bore H7

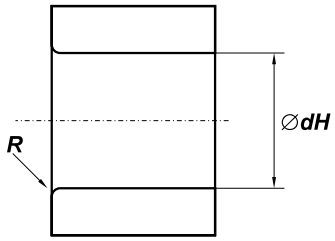
Type	Inside diameter ∅ d (G7)			Outside diameter ∅D (s7)			Length L (js13)
	Dimension	Min.	Max.	Dimension	Min.	Max.	
AM 03 06	03	3,002	3,012	06	6,019	6,031	4, 5
AM 04 08	04	4,004	4,016	08	8,023	8,038	4, 8, 12
AM 04 10	04	4,004	4,016	10	10,023	10,038	5, 10
AM 05 09	05	5,004	5,016	09	9,023	9,038	5, 8, 11
AM 05 10	05	5,004	5,016	10	10,023	10,038	5, 10, 14
AM 06 08	06	6,004	6,016	08	8,023	8,038	8
AM 06 10	06	6,004	6,016	10	10,023	10,038	6, 10, 12, 15
AM 06 12	06	6,004	6,016	12	12,028	12,046	6, 12, 15
AM 07 11	07	7,005	7,020	11	11,028	11,046	8, 13
AM 08 10	08	8,005	8,020	10	10,028	10,046	8
AM 08 11	08	8,005	8,020	11	11,028	11,046	12
AM 08 12	08	8,005	8,020	12	12,028	12,046	8, 10, 12, 13, 16
AM 08 14	08	8,005	8,020	14	14,028	14,046	8, 10, 14, 16, 17, 20
AM 09 14	09	9,005	9,020	14	14,028	14,046	8, 16
AM 10 13	10	10,005	10,020	13	13,028	13,046	10, 13, 18, 20
AM 10 14	10	10,005	10,020	14	14,028	14,046	10
AM 10 15	10	10,005	10,020	15	15,028	15,046	10, 15, 20
AM 10 16	10	10,005	10,020	16	16,028	16,046	10, 16, 20, 25
AM 12 15	12	12,006	12,024	15	15,028	15,046	12, 15, 18, 20
AM 12 16	12	12,006	12,024	16	16,028	16,046	12, 16, 20, 30
AM 12 17	12	12,006	12,024	17	17,028	17,046	12, 17, 24
AM 12 18	12	12,006	12,024	18	18,028	18,046	10, 12, 13, 14, 15, 18, 25
AM 14 18	14	14,006	14,024	18	18,028	18,046	14, 18, 22
AM 14 20	14	14,006	14,024	20	20,035	20,056	14, 20, 30
AM 15 20	15	15,006	15,024	20	20,035	20,056	12, 14, 15, 20, 24, 30
AM 15 21	15	15,006	15,024	21	21,035	21,056	15
AM 15 22	15	15,006	15,024	22	22,035	22,056	15, 22, 23
AM 16 18	16	16,006	16,024	18	18,028	18,046	22, 30
AM 16 20	16	16,006	16,024	20	20,035	20,056	16, 20, 30
AM 16 22	16	16,006	16,024	20	20,035	20,056	16, 22, 30
AM 18 22	18	18,006	18,024	22	22,035	22,056	18, 22, 28, 30
AM 18 23	18	18,006	18,024	23	23,035	23,056	18, 23, 28
AM 18 24	18	18,006	18,024	24	24,035	24,056	18, 24, 28
AM 18 25	18	18,006	18,024	25	25,035	25,056	16, 25, 30
AM 19 25	19	19,007	19,028	25	25,035	25,056	25
AM 20 24	20	20,007	20,028	24	24,035	24,056	20, 30
AM 20 25	20	20,007	20,028	25	25,035	25,056	12, 14, 16, 18, 20, 25, 26, 30, 35, 40
AM 20 26	20	20,007	20,028	26	26,035	26,056	20, 30, 40
AM 20 28	20	20,007	20,028	28	28,035	28,056	20, 28, 30, 40
AM 22 26	22	22,007	22,028	26	26,035	26,056	10, 13, 15, 20
AM 22 28	22	22,007	22,028	28	28,035	28,056	15, 25, 28, 30, 35, 40
AM 22 32	22	22,007	22,028	32	32,043	32,068	22
AM 24 30	24	24,007	24,028	30	30,043	30,068	24, 30
AM 25 30	25	25,007	25,028	30	30,043	30,068	20, 25, 30, 35, 40
AM 25 32	25	25,007	25,028	32	32,043	32,068	25, 32, 35, 40
AM 28 32	28	28,007	28,028	32	32,043	32,068	20, 28, 30
AM 28 34	28	28,007	28,028	34	34,043	34,068	18
AM 30 35	30	30,007	30,028	35	35,043	35,068	20, 25, 30, 35, 40
AM 30 38	30	30,007	30,028	38	38,043	38,068	26, 30, 38, 50
AM 30 40	30	30,007	30,028	40	40,043	40,068	30, 40, 50
AM 32 42	32	32,009	32,034	42	42,043	42,068	16, 20, 25, 30
AM 32 50	32	32,009	32,034	50	50,043	50,068	25, 30, 35
AM 35 42	35	35,009	35,034	42	42,043	42,068	35, 42, 50
AM 35 45	35	35,009	35,034	45	45,043	45,068	35, 50
AM 35 48	35	35,009	35,034	48	48,043	48,068	30, 35, 40, 45
AM 40 45	40	40,009	40,034	45	45,043	45,068	40, 45, 55
AM 40 50	40	40,009	40,034	50	50,043	50,068	40, 50, 60
AM 45 55	45	45,009	45,048	55	55,053	55,099	45, 55, 60, 65 Tolerance ∅ G8/s8
AM 50 60	50	50,009	50,048	60	60,053	60,099	50, 60, 70 ∅ G8/s8
AM 55 65	55	55,010	55,056	65	65,053	65,099	55, 60 ∅ G8/s8
AM 55 70	55	55,010	55,056	70	70,059	70,105	25 ∅ G8/s8
AM 60 70	60	60,010	60,056	70	70,059	70,105	50, 60 ∅ G8/s8
AM 60 75	60	60,010	60,056	75	75,059	75,105	40, 45, 60 ∅ G8/s8
AM 85 105	85	85,010	85,056	105	105,059	105,105	30 ∅ G8/s8
AM 100 125	100	100,010	100,056	125	125,059	125,105	30, 40, 50 ∅ G8/s8

Fitting data

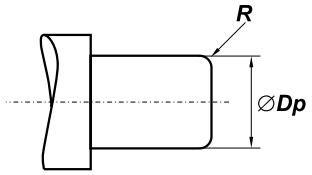
Free bush



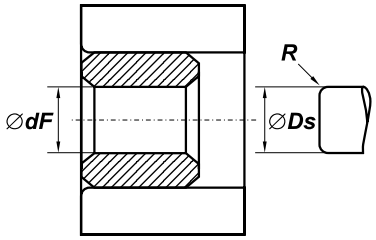
Housing



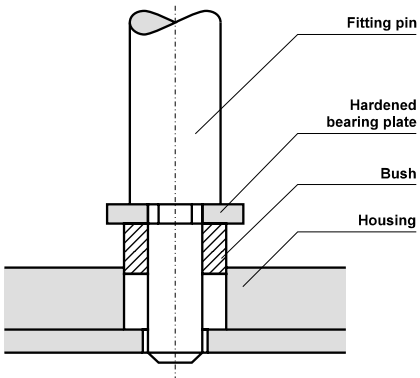
Fitting pin



Fitted bush



Fitting



Free bush			Housing ∅ dH		Fitting pin ∅ Dp		Fitted bush ∅ dF		Shaft ∅ Ds	
Type	ID	OD	∅ min.	∅ max.	∅ min.	∅ max.	∅ min.	∅ max.	∅ min.	∅ max.
AM 03 06	03	06	6,000	6,012	3,002	3,006	3,000	3,010	2,984	2,994
AM 04 08	04	08	8,000	8,015	4,004	4,009	4,000	4,012	3,978	3,990
AM 04 10	04	10	10,000	10,015	4,004	4,009	4,000	4,012	3,978	3,990
AM 05 09	05	09	9,000	9,015	5,004	5,009	5,000	5,012	4,978	4,990
AM 05 10	05	10	10,000	10,015	5,004	5,009	5,000	5,012	4,978	4,990
AM 06 08	06	08	8,000	8,015	6,004	6,009	6,000	6,012	5,978	5,990
AM 06 10	06	10	10,000	10,015	6,004	6,009	6,000	6,012	5,978	5,990
AM 06 12	06	12	12,000	12,018	6,004	6,009	6,000	6,012	5,978	5,990
AM 07 11	07	11	11,000	11,018	7,005	7,012	7,000	7,015	6,972	6,987
AM 08 10	08	10	10,000	10,015	8,006	8,012	8,000	8,015	7,972	7,987
AM 08 11	08	11	11,000	11,018	8,006	8,012	8,000	8,015	7,972	7,987
AM 08 12	08	12	12,000	12,018	8,006	8,012	8,000	8,015	7,972	7,987
AM 08 14	08	14	14,000	14,018	8,006	8,012	8,000	8,015	7,972	7,987
AM 09 14	09	14	14,000	14,018	9,006	9,012	9,000	9,015	8,972	8,987
AM 10 13	10	13	13,000	13,018	10,006	10,012	10,000	10,015	9,972	9,987
AM 10 14	10	14	14,000	14,018	10,006	10,012	10,000	10,015	9,972	9,987
AM 10 15	10	15	15,000	15,018	10,006	10,012	10,000	10,015	9,972	9,987
AM 10 16	10	16	16,000	16,018	10,006	10,012	10,000	10,015	9,972	9,987
AM 12 15	12	15	15,000	15,018	12,007	12,015	12,000	12,018	11,966	11,984
AM 12 16	12	16	16,000	16,018	12,007	12,015	12,000	12,018	11,966	11,984
AM 12 17	12	17	17,000	17,018	12,007	12,015	12,000	12,018	11,966	11,984
AM 12 18	12	18	18,000	18,018	12,007	12,015	12,000	12,018	11,966	11,984
AM 14 18	14	18	18,000	18,018	14,007	14,015	14,000	14,018	13,966	13,984
AM 14 20	14	20	20,000	20,021	14,007	14,015	14,000	14,018	13,966	13,984
AM 15 20	15	20	20,000	20,021	15,007	15,015	15,000	15,018	14,966	14,984
AM 15 21	15	21	21,000	21,021	15,007	15,015	15,000	15,018	14,966	14,984
AM 15 22	15	22	22,000	22,021	15,007	15,015	15,000	15,018	14,966	14,984
AM 16 18	16	18	18,000	18,018	16,007	16,015	16,000	16,018	15,966	15,984
AM 16 20	16	20	20,000	20,021	16,007	16,015	16,000	16,018	15,966	15,984
AM 16 22	16	22	22,000	22,021	16,007	16,015	16,000	16,018	15,966	15,984
AM 18 22	18	22	22,000	22,021	18,007	18,015	18,000	18,018	17,966	17,984
AM 18 23	18	23	23,000	23,021	18,007	18,015	18,000	18,018	17,966	17,984
AM 18 24	18	24	24,000	24,021	18,007	18,015	18,000	18,018	17,966	17,984
AM 18 25	18	25	25,000	25,021	18,007	18,015	18,000	18,018	17,966	17,984
AM 19 25	19	25	25,000	25,021	19,007	19,015	19,000	19,018	18,966	19,984
AM 20 24	20	24	24,000	24,021	20,008	20,017	20,000	20,021	19,959	19,980
AM 20 25	20	25	25,000	25,021	20,008	20,017	20,000	21,021	19,959	19,980
AM 20 26	20	26	26,000	26,021	20,008	20,017	20,000	20,021	19,959	19,980
AM 20 28	20	28	28,000	28,021	20,008	20,017	20,000	20,021	19,959	19,980
AM 22 26	22	26	26,000	26,021	22,008	22,017	22,000	22,021	21,959	21,980
AM 22 28	22	28	28,000	28,021	22,008	22,017	22,000	22,021	21,959	21,980
AM 22 32	22	32	32,000	32,025	22,008	22,017	22,000	22,021	21,959	21,980
AM 24 30	24	30	30,000	30,021	24,008	24,017	24,000	24,021	23,959	23,980
AM 25 30	25	30	30,000	30,021	25,008	25,017	25,000	25,021	24,959	24,980
AM 25 32	25	32	32,000	32,025	25,008	25,017	25,000	25,021	24,959	24,980
AM 28 32	28	32	32,000	32,025	28,008	28,017	28,000	28,021	27,959	27,980
AM 28 34	28	34	34,000	34,025	28,008	28,017	28,000	28,021	27,959	27,980
AM 30 35	30	35	35,000	35,025	30,008	30,017	30,000	30,021	29,959	29,980
AM 30 38	30	38	38,000	38,025	30,008	30,017	30,000	30,021	29,959	29,980
AM 30 40	30	40	40,000	40,025	30,008	30,017	30,000	30,021	29,959	29,980
AM 32 42	32	42	42,000	42,025	32,009	32,020	32,000	32,025	31,950	31,975
AM 32 50	32	50	50,000	50,025	32,009	32,020	32,000	32,025	31,950	31,975
AM 35 42	35	42	42,000	42,025	35,009	35,020	35,000	35,025	34,950	34,975
AM 35 45	35	45	45,000	45,025	35,009	35,020	35,000	35,025	34,950	34,975
AM 35 48	35	48	48,000	48,025	35,009	35,020	35,000	35,025	34,950	34,975
AM 40 45	40	45	45,000	45,025	40,009	40,020	40,000	40,025	39,950	39,975
AM 40 50	40	50	50,000	50,025	40,009	40,020	40,000	40,025	39,950	39,975
AM 45 55	45	55	55,000	55,030	45,009	45,020	45,000	45,039	44,950	44,975
AM 50 60	50	60	60,000	60,030	50,009	50,020	50,000	50,039	49,950	49,975
AM 55 65	55	65	65,000	65,030	55,010	55,024	55,000	55,046	54,940	54,970
AM 55 70	55	70	70,000	70,030	55,011	55,024	55,000	55,046	54,940	54,970
AM 60 70	60	70	70,000	70,030	60,011	60,024	60,000	60,046	59,940	59,970
AM 60 75	60	75	75,000	75,030	60,011	60,024	60,000	60,046	59,940	59,970
AM 85 105	85	105	85,000	85,035	85,013	85,028	85,000	85,054	83,929	83,964
AM 100 125	100	125	125,000	125,040	100,013	100,028	100,000	100,054	99,929	99,964

Technical information

Basic data		
Chemical content	C = 0,2 % max. Sn = 9–11 % max. Other elements = 2 % max. Cu = rest	
Density	6,4 – 6,8 g/cm^3	
Porosity	25 ± 2,5 %	
Hardness	> 25 HB	
Radial crush strength	> 120 MPa	
Max. sliding velocity	6 m/s	
Limit load at v = 0,15 m/s	8 MPa	
Bearing capacity at v = 0,5 m.s^{-1}	2,8 MPa	
Bearing life	5 000 hours	
Temperature operating range	–10 °C to +80 °C	
Oil content	Wall thickness ≤ 4 mm	min. 2,3 % of the mass
	Wall thickness > 4 mm	min. 2,1 % of the mass

Lubrication

Self-lubricated bearings are impregnated with the oil PP80 (SAE 80). In special cases on customer request other lubricants can be used. A replemishment of oil should be carried out after 1000 hours of use or yearly. Bearings which are running submerged in oil or in oil splash will not require replemishment. Any application thought to be outside standard conditions should be referred to our Technical Department.

Storage

Self-lubricated bearings can be stored for considerable periods without deterioration or loss of oil are kept in a metal or other non-absorbent container or packing at room temperature. Overheating of the storage space could cause oil loss by vaporization, in that case re-oiling is necessary before fitting.

Some basic rules for users

- Shaft clearance after fitting should be 0.002 – 0.004 of the shaft diameter
- Shaft journal should be fine grinded to roughness Ra 0.2
- Shaft hardness to be 60 HRc
- Machining of the inside diameter is not permissible because it may result in self-lubrication lost and bearing seizure
- Other surfaces of the bearings can be machined using usual machining techniques
- Re-oiling with oil PP80 is necessary after oil loss during storage or after machining of the bearing

Remark: Dimensional or matarial deviations are possible and the manufacturer would be pleased to quote for your specific requirements.

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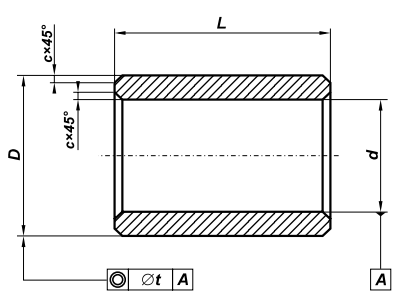
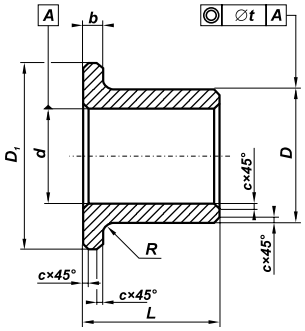
Self-lubricated porous bearings

Parameter	unit	self-lubricated bearings		
		iron	bronze	
Chemical content	%	C = 0.2 max.	C = 0.2 max.	C = 0,5 – 2
		Others = 2 max.	Sn = 9 – 11	
		Fe = the rest	Others = 2 max.	
			Cu = the rest	
Density	g/cm^3	5,6 to 6,2	6,4 – 6,8	6,0 – 6,5
Porosity	%	23,5 ± 2,5	25 ± 2,5	
Hardness	HB	min. 25	min. 25	min. 20
Radial crush strength	MPa	min. 150	min. 120	min. 100
Max. sliding velocity	m.s^{-1}	3	6	
Limit load at v = 0.15 m/s	MPa	8	8	
Bearing capacity at v = 0.5 m/s	MPa	2,8	3,2	
Bearing life	hours	max. 6000	max. 5000	
Temperature operating range	˚C	–10 to 80	–10 to 80	
Oil content:				
wall thickness ≤ 4 mm	% G	min. 2.4	min. 2.3	
wall thickness > 4 mm	% G	min. 2.3	min. 2.1	

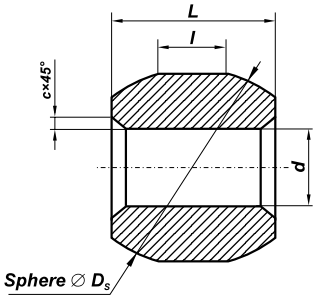
Available types of self-lubricating bearings



A type
Plain bearing



B type
Flange bearing



C type
Spherical bearing

Dimension tolerance field for both types A + B		
d	≤ 40	G7
	> 40	G8
D	≤ 50	r7
	> 50	r8
t	≤ D50	IT8
	> D50	IT9
L		js13

For fitted bore H7

Dimension tolerance field for C type	
ID	H7
Ds	h11
L	js13

For spherical hole diameter in housing H10 or G10

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Marking and ordering

Bearings of **A** type are marked:

A ∅ d / ∅ D × L – SZO
– SBO

Bearings of **B** and **C** type are marked:

B or C ∅ d – SZO + drawing
– SBO + drawing

Footnote:
∅ d = ID = inside diameter
∅ D = OD = outside diameter
L = bearing length
SZO = sintered iron – oiled
SBO = sintered bronze – oiled

Lubrication

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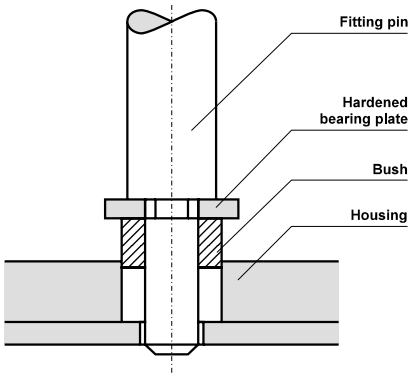
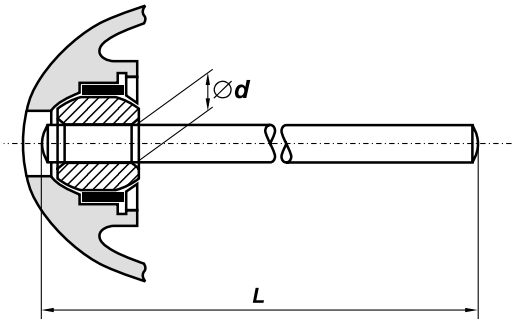
Fitting

A and **B** type



C type



Storage

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Metalsint

Sintered metal filters

Sintered metal filters are characterized by their porosity. The sintered filtering material produced via Powder Metallurgy techniques have wide and variety applications and is in an advantageous competetive position against the traditional filtering material.

Mechanical and physical properties are controllable with the chemical content, grain size of the used powder and both temperature and time of sintering.

Sintered metal filters are produced from metal powders. The basic material properties of sintered metal filters are: porosity, filterability and filter throughflow.

Quality and application features:
– controlled accuracy of pore sizes
– mechanical strength (tensile strength of 30 MPa, bending strength of 60 MPa)
– applicability at higher temperatures and temperature variations (up to 200 °C)
– corrosion resistance in agressive environment
– possibility of metallic bonding of individual units (soldering and glueing)
– possibility of moulding the filter to almost any conceivable shape

Type	Porosity %	Throughflow (ml/cm^2/min.) at pressure 1 at)			Filterability (µm)
		for Nitrogen	for petroleum	for water (30 torr)	
SINT AISI 316B □ 38 – 50 × 4 0,2 – 1 × pressed	29	830		314	18 – 22
SINT AISI 316B □ 38 – 50 × 4 0,2 – double pressed	25	860		400	16 – 20
SINT AISI 316B □ 38 × 6 0,04	60	730		290	15
Bronze filters with different grain sizes	40		170 – 290		18 – 120

Material group	Grain size of powder in mm	Filterability in microns
A	0,045 – 0,063	5
B	0,063 – 0,16	10
C	0,16 – 0,315	25
D	0,015 – 0,63	55
E	0,63 – 1,00	100

Filterability:

gives the size of the smallest particles that are catched on the metal filter.

Throughflow:

gives the resistance of the metal filter to the flow of the filtered liquid.

The examples of the throughflow of the air and the oil are illustrated in the Diagrams 1 and 2.

Diagram No. 1: The throughflow of air

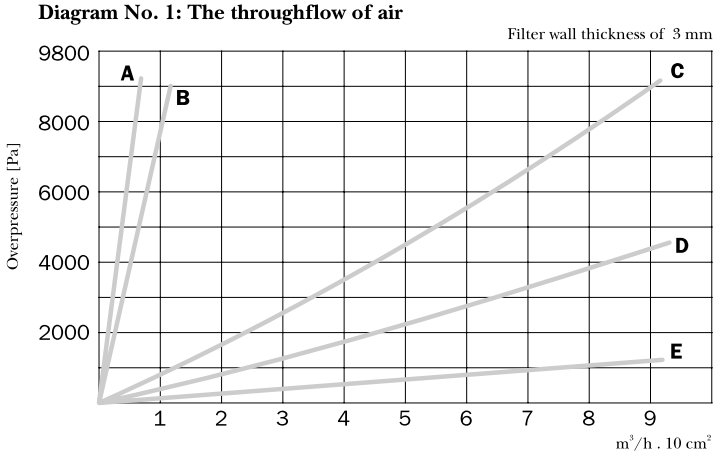
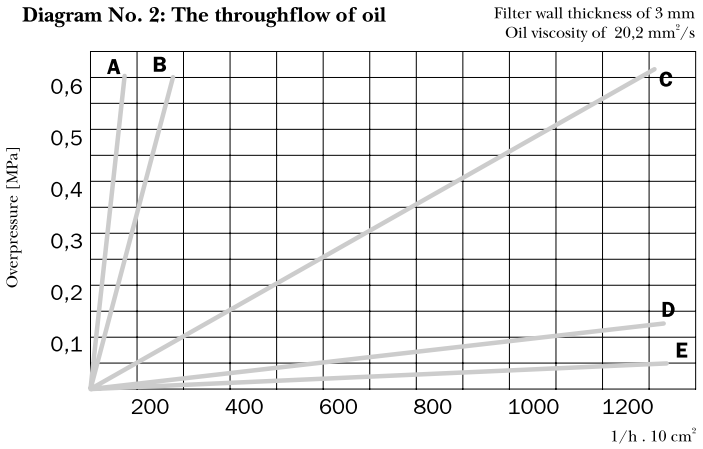
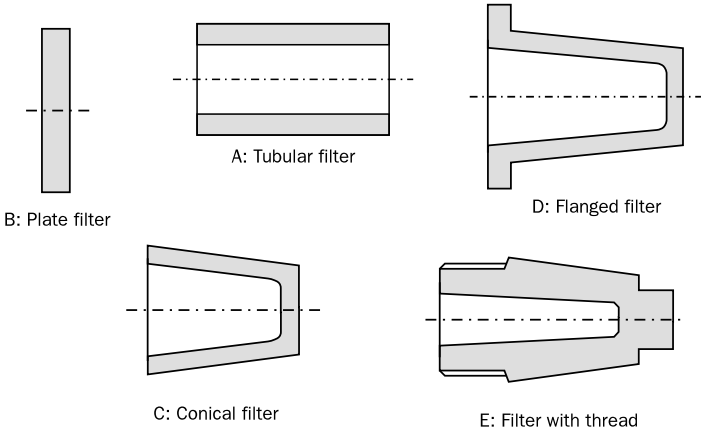


Diagram No. 2: The throughflow of oil



The shapes of common produced filters:



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